

**IBM**

**Mag Card**

# **Maintenance Analysis Procedures**

**IBM Mag Card Composer**

## INTRODUCTION

This Maintenance Analysis Procedures Manual is produced for US and World Trade customer engineers and other service personnel. The purpose of this manual is to assist service personnel in diagnosing failures on the IBM Mag Card Composer.

Service personnel using this manual must have completed the student training course or understand the theory of operation as explained in the service manual Form No. 241-6046-0, which should be used with this manual.

**IBM MAG CARD COMPOSER  
MAINTENANCE ANALYSIS PROCEDURES  
TABLE OF CONTENTS**

*START OF CALL*

*Map 0010 – Start Of Call*

*POWER SUPPLY START*

*Map 6000 – Power Supply Start*

*Map 6010 – Power Supply*

*Map 6020 – Power Supply A.C. Checks*

*Map 6030 – Power Supply*

*Map 6040 – Power Supply D.C. Tolerance Diagnostics*



start of call

MAP 0010-1

map0010

PAGE 1 OF 2

#### ENTRY POINTS

FROM	ENTER THIS MAP
MAP NUMBER	ENTRY POINT
PAGE NUMBER	STEP NUMBER

No entries in this table

#### EXIT POINTS

EXIT THIS MAP	TO
PAGE NUMBER	STEP NUMBER
MAP NUMBER	ENTRY POINT
1	002
1	004
2	008

(Step 001 continued)  
repaired, repair as required  
and verify the fix.

-Turn the power off and then on.

Do all the motors and fans  
(printer and card deck motor and  
printer and power supply fan)  
run?

Y N

002  
GO TO MAP 6000, ENTRY POINT A.

003  
Did the card deck "Click" when  
power was applied?

Y N

004  
GO TO MAP 6010, ENTRY POINT A.

001

\*\*\*\*\*START\*\*\*\*\*

-Discuss the problem or failure  
symptom with the operator.

-Request a sample and/or any  
other information about the  
problem.

-After obtaining the information  
from the operator, make a  
visual inspection for obvious  
defects (loose or broken parts,  
etc.)

-If the cause of the failure can  
EASILY be determined and  
(Step 001 continues)

A start of call  
1  
map0010  
PAGE 2 OF 2  
005  
-Ensure that the "ENTRY" button  
is up and that there is not a  
card in the console.  
-Depress several characters.  
Did all the characters print?  
Y N  
006  
Is the "Remove Card" message  
on?  
Y N  
007  
-Check the voltages at the  
following planar, and the  
printer DC disconnect  
connections.  
Connector- Voltage  
Pin Number  
-----  
1-12 +24VDC  
1-23 + 9VDC  
2-13 + 5VDC  
2-16 - 5VDC  
4-03 + 5VDC  
4-22 + 9VDC  
DC-1 +12VDC  
DC-2 + 9VDC  
DC-3 +24VDC  
-----  
(Step 007 continues)

B C

MAP 0010-2

B C  
|  
|  
| (Step 007 continued)  
|  
| Are the voltages correct  
| within a 10% tolerance?  
| Y N  
|  
| 008  
| GO TO MAP 6010,  
| ENTRY POINT A.  
|  
| 009  
| -The problem is likely to be  
| in the printer. Go to the  
| Printer Function chart for  
| the last machine operation  
| which occurred, if known.  
| If this is not known, go to  
| the Planar Static Voltage  
| Check.  
|  
| 010  
| -The card deck is "busy". Go  
| to the Load Function chart  
| for the card deck.  
|  
| 011  
| -Go to the Quick Check for more  
| information about the problem.

MAP 6000

PAGE 1 OF 5

## ENTRY POINTS

-----			
FROM	ENTER THIS MAP		
-----			
MAP	ENTRY	PAGE	STEP
NUMBER	POINT	NUMBER	NUMBER
-----			
0010	A	1	001

001

(ENTRY POINT A)

\*\*\*\*\*START\*\*\*\*\*

- POWER ON.

Does the power supply fan  
operate?

Y N

| 002

| - POWER OFF.

| - Using the CE ohm meter on the  
| lowest OHMS scale, check the  
| MAIN LINE fuse.

| (Step 002 continues)

4  
A

## EXIT POINTS

EXIT THIS MAP		TO	
PAGE	STEP	MAP	ENTRY
NUMBER	NUMBER	NUMBER	POINT
5	037	6010	A

(Step 002 continued)

Does the meter indicate zero ohms  
across the fuse?

Y N

| 003

| - Replace the fuse.

| - POWER ON.

Does the power supply fan  
operate?

Y N

| 004

| - POWER OFF.

| - Using the CE ohm meter on  
| the lowest OHMS scale,  
| check the MAIN LINE fuse.

Does the meter indicate zero  
ohms across the fuse?

Y N

4 3 3 2  
B C D E

MAP 6000-1

# E POWER SUPPLY START

1

MAP 6000

PAGE 2 OF 5

005

- Unplug the reader/recorder motor.

- Replace the fuse.

- POWER ON.

Does the power supply fan operate?

Y N

006

- POWER OFF.

- Using the CE ohm meter on the lowest OHMS scale, check the MAIN LINE fuse.

Does the meter indicate zero ohms across the fuse?

Y N

3 3  
F G H

H

007

- Unplug the reader/recorder motor cable at the power supply end. (P15)

- Replace the fuse.

- POWER ON.

Does the power supply fan operate?

Y N

008

- POWER OFF.

- Using the CE ohm meter on the lowest OHMS scale, check the MAIN LINE fuse.

Does the meter indicate zero ohms across the fuse?

Y N

3 3  
J K L

L

MAP 6000-2

009

- Unplug the line cord.

- Disconnect the power supply fan.

- Replace the fuse.

- Plug in the line cord.

- POWER ON.

- Wait at least one minute, then POWER OFF and recheck the fuse.

Does the meter indicate zero ohms across the fuse?

Y N

010

- Replace the fuse.

- Unplug the AC secondary plugs P4, P5, and P6 from the power supply.

- POWER ON for at least one minute, then POWER OFF.

- Using the CE ohm meter on the (Step 010 continues)

3  
M

MAP 6000-2



## POWER SUPPLY START

MAP 6000

PAGE 3 OF 5

(Step 010 continued)  
lowest OHMS scale, check the  
MAIN LINE fuse.

Does the meter indicate zero ohms  
across the fuse?

Y N

011

- Replace the power supply  
baseplate assembly.

- Verify the fix.

- Make sure that all components  
and plugs that were removed  
or unplugged, are restored.

012

- Replace the power supply  
Distribution Board.

- Verify the fix.

- Make sure that all components  
and plugs that were removed or  
unplugged, are restored.

G J K M  
2 2 2 2

013

- Replace the power supply  
fan assembly.

- Verify the fix.

- Make sure that all  
components and plugs that  
were removed or  
unplugged, are restored.

014

- Return to the \*\*\*START\*\*\*  
of THIS MAP.

015

- POWER OFF.

- Repair/replace the  
reader/recorder motor cable.

016

- Return to the \*\*\*START\*\*\* of  
THIS MAP.

C D F  
1 1 2

MAP 6000-3

017

- POWER OFF.

- Replace the reader/recorder  
motor.

- Verify the fix.

- Make sure that all  
components and plugs that  
were removed or unplugged,  
are restored.

018

- Return to the \*\*\*START\*\*\* of  
THIS MAP.

019

- A quick change in the line  
voltage or a defective fuse MAY  
have been the problem.

- Verify the fix.

- Make sure that all components  
and plugs that were removed or  
unplugged, are restored.

POWER  
SUPPLY

MAP 6000-3

B  
1

POWER SUPPLY START

MAP 6000

PAGE 4 OF 5

020

- POWER ON.

Is 115VAC present at the female side of P-14, pins 1 and 3? (AC input cable plug.)

Y N

021

Is 115VAC present at the female side of the 12 pin AC Adapter cable plug pins 2 and 12?

Y N

022

Is the printer motor operating?

Y N

023

- The problem is in the Printer. Refer to the wiring diagram in the Service Manual to diagnose the failure.

N P Q

N P Q

024

- The problem is in the power cable between the Printer and the console. Refer to the A.C. wiring diagram in the Service Manual to diagnose the failure.

025

- POWER OFF.

- Repair/replace the AC ADAPTER cable.

- Verify the fix.

- Make sure that all components and plugs that were removed or unplugged, are restored.

026

Is 115VAC present on the Barrier Terminal Strip in the power supply between terminals "115" and "COM"?

Y N

R S

A R S

1

MAP 6000-4

027

- POWER OFF.

- Replace the power supply baseplate assembly.

- Verify the fix.

- Make sure that all components and plugs that were removed or unplugged, are restored.

028

- POWER OFF.

- Replace the power supply fan assembly.

- Verify the fix.

- Make sure that all components and plugs that were removed or unplugged, are restored.

029

Does the reader/recorder motor operate?

Y N

5 5  
T U

MAP 6000-4

POWER  
SUPPLY

U  
4

POWER SUPPLY START

MAP 6000

PAGE 5 OF 5

030  
Is 115VAC present at the  
reader/recorder motor connector?  
Y N

031  
Is 115VAC present at the power  
supply end of the  
reader/recorder motor cable?  
Y N

032  
- POWER OFF.

- Replace the power supply  
baseplate assembly.

- Verify the fix.

- Make sure that all  
components and plugs that  
were removed or unplugged,  
are restored.

V W

T V W  
4

033  
- POWER OFF.

- Repair/replace the  
reader/recorder motor  
cable.

- Verify the fix.

- Make sure that all  
components and plugs that  
were removed or unplugged,  
are restored.

034  
- POWER OFF.

- Replace the reader/recorder  
motor.

- Verify the fix.

- Make sure that all components  
and plugs that were removed  
or unplugged, are restored.

035  
Does the printer fan operate?  
Y N

X Y

X Y

MAP 6000-5

036  
- The problem is in the  
Printer. Refer to the wiring  
diagram in the Service Manual  
to diagnose the failure.

037  
GO TO MAP 6010, ENTRY POINT A.

MAP 6010

PAGE 1 OF 11

## ENTRY POINTS

-----			
FROM	ENTER THIS MAP		
-----			
MAP NUMBER	ENTRY POINT	PAGE NUMBER	STEP NUMBER
-----			
0010	A	1	001
6000	A	1	001
6030	A	1	001

## EXIT POINTS

EXIT THIS MAP		TO	
PAGE NUMBER	STEP NUMBER	MAP NUMBER	ENTRY POINT
2	005	6020	A
4	021	6020	A
4	026	6020	A
6	040	6020	A
8	055	6020	A
3	011	6030	A
3	012	6030	A
8	052	6030	A
9	065	6030	A
10	068	6030	A
3	015	6040	A

001  
(ENTRY POINT A)  
\*\*\*\*\*START\*\*\*\*\*

- POWER OFF for a minimum of 30 seconds.

- POWER ON.  
(Step 001 continues)

(Step 001 continued)

Is K1 relay energized?

Y N

002

- POWER OFF.

- Unplug the P9 connector.

- Wait for a minimum of 30 seconds.

- POWER ON.

Is K1 relay energized?

Y N

003

- POWER OFF.

- Check the D.C. fuses, F9, F10, F11, F12, F13, and F16 using the lowest OHM scale on the CE Meter.

Were any of the fuses found to be defective?

Y N

3 3 3 2  
A B C D

MAP 6010-1

D POWER SUPPLY  
1  
MAP 6010  
PAGE 2 OF 11

004  
- POWER ON.

- Is +24VDC present on fuse F9?  
Y N

005  
GO TO MAP 6020, ENTRY POINT A.

006  
- POWER OFF.

- Jumper P2-15 (or TP-1) to FRAME ground.

- NOTE: In late level machines, this point is brought out to a point on the regulator board where it can be reached without removing the power supply from the machine, and is marked "TP-1". On early level machines, it will be necessary to POWER the machine OFF, remove the power supply far enough to be able to attach a jumper lead to P2-15, and then power ON the machine with the power supply still out of the machine. Be VERY CAREFUL not (Step 006 continues)

(Step 006 continued)  
to allow a short to occur between P2-15 and P2-14 or any other point.

- POWER ON.

Is K1 relay energized?

Y N

007

- POWER OFF.

- It WILL be necessary at this time, to remove the power supply from the machine, far enough to reach P2-14.

- Using the proper OHM scale, measure the resistance between fuse F9, and connector P2-14.

Does the resistance measure between 400 and 600 Ohms?

Y N

E F G

E F G

MAP 6010-2

008

- Replace the Distribution Board.

- Make sure all connectors are replugged.

- Remove any jumpers that were required.

- Verify the fix.

009

- Replace the Regulator Board.

- Make sure all connectors are replugged.

- Remove any jumpers that were required.

- Verify the fix.

010

- After ensuring that the jumper to keep the K1 relay energized is still in place, Return to the \*\*\*START\*\*\* of THIS MAP.

MAP 6010-2

POWER  
SUPPLY

A B C  
1 1 1

# POWER SUPPLY

MAP 6010

PAGE 3 OF 11

011

- POWER OFF.  
GO TO MAP 6030,  
ENTRY POINT A.

012

- POWER OFF.  
GO TO MAP 6030, ENTRY POINT A.

013

- Using the following table,  
check all the voltages on P9  
with reference to FRAME ground.

- Record the results of these  
checks for later use in the  
MAPS.

NAME	TOLERANCE	PLUG-PIN
+24V	+23.4 to +27.2	P9-1 P9-15
+12V	+10.8 to +13.6	P9-3
+9V(R)	+8.4 to +9.6	P9-2 P9-6
+5V(R)	+4.9 to	P9-10
(Step 013 continues)		

(Step 013 continued)

+5.5 P9-11

+5V +4.9 to P9-4  
(Sense) +5.5

-12V -10.7 to P10-1  
-13.6

-5V -4.5 to P9-8  
-5.7 P9-12

Are ALL of the voltages present,  
and within tolerance?

Y N

014

Is ANY voltage missing? (Less  
than half the expected reading)

Y N

015

GO TO MAP 6040,  
ENTRY POINT A.

1  
0  
H J

J

MAP 6010-3

016

- POWER OFF.

- Check the D.C. fuses, F9, F10,  
F11, F12, F13, and F16 using  
the lowest OHM scale on the CE  
Meter.

Were any of the fuses found to be  
defective?

Y N

017

Is +24VDC present on P9-1, and  
P9-15?

Y N

018

- Replace the Distribution  
Board.

- Make sure all connectors  
are replugged.

- Remove any jumpers that  
were required.

- Verify the fix.

1  
0 4  
K L

MAP 6010-3

## L POWER SUPPLY

3

MAP 6010

PAGE 4 OF 11

019

Is +12VDC present on P9-3 ?

Y N

020

Is +12VDC present on fuse F10?

Y N

021

GO TO MAP 6020,

ENTRY POINT A.

022

- Replace the Distribution Board.

- Make sure all connectors are replugged.

- Remove any jumpers that were required.

- Verify the fix.

023

Is +9VDC present on P9-2 \*\*AND\*\* P9-6?

Y N

6  
M N

N

024

Is +9VDC present on P9-2 \*\*OR\*\* P9-6?

Y N

025

Is -24VDC present on fuse F12?

Y N

026

GO TO MAP 6020,

ENTRY POINT A.

027

- POWER OFF.

- Using the \*\*LOWEST\*\* ohms scale (or the 2K ohm/diode scale of the CE Digital Meter), measure the resistance between each of the following pins on the P7 connector: (With the connector unplugged.)

RED LEAD (+) BLACK LEAD (-)

P7-1 -- P7-2

P7-3 -- P7-2

P7-1 -- P7-3

(Step 027 continues)

6  
P

## POWER SUPPLY

MAP 6010

PAGE 5 OF 11

(Step 027 continued)

P7-3 -- P7-1  
 P7-5 -- P7-4  
 P7-5 -- P7-6  
 P7-6 -- P7-5  
 P7-6 -- P7-4

Do ALL the resistances measured  
 indicate infinite resistance?

Y N

028

- Replace the Heat Sink Assembly.
- Make sure all connectors are replugged.
- Remove any jumpers that were required.
- Verify the fix.

Q

029

- Using the \*\*LOWEST\*\* ohms scale (or the 2K ohm/diode scale of the CE Digital Meter), measure the resistance between each of the following pins on the P7 connector: (With the connector unplugged.)

RED LEAD (+) BLACK LEAD (-)

P7-2 --- P7-1  
 P7-2 --- P7-3  
 P7-4 --- P7-5  
 P7-4 --- P7-6

Do ALL the resistances measured  
 indicate between 15 and 25 OHMS  
 (400-800 ohms on the CE Digital  
 Meter)?

Y N

R S

R S

MAP 6010-5

030

- Replace the Heat Sink Assembly.
- Make sure all connectors are replugged.
- Remove any jumpers that were required.
- Verify the fix.

031

Is +24VDC present on connector  
 P1-13?

Y N

032

- Replace the Distribution Board.
- Make sure all connectors are replugged.
- Remove any jumpers that were required.
- Verify the fix.

6

T

MAP 6010-5

Q



T  
5

POWER SUPPLY

MAP 6010

PAGE 6 OF 11

033  
Is +12VDC present on connector  
P1-11?  
Y N

034  
- Replace the Distribution  
Board.  
- Make sure all connectors are  
replugged.  
- Remove any jumpers that were  
required.  
- Verify the fix.

035  
- The Regulator Board OR the  
Distribution Board is  
defective.  
- Get BOTH the Regulator and the  
Distribution Board, but DO NOT  
replace the Distribution board  
unless the Regulator Board  
fails to fix the problem.  
- Make sure all connectors are  
replugged.  
(Step 035 continues)

M P  
4 4

(Step 035 continued)

- Remove any jumpers that  
were required.  
- Verify the fix.

036  
- Replace the Distribution  
Board.  
- Make sure all connectors are  
replugged.  
- Remove any jumpers that were  
required.  
- Verify the fix.

037  
Is +5VDC present on P9-10 \*\*AND\*\*  
P9-11?  
Y N

038  
Is +5VDC present on P9-10  
\*\*OR\*\* P9-11?  
Y N

8 7  
U V W

W

MAP 6010-6

039  
Is +9VDC present between the fuse  
F16 (Red + Lead) and D14 Anode?  
(The Black - Lead can be attached  
to the exposed screw thread on  
D14.)  
Y N

040  
GO TO MAP 6020, ENTRY POINT A.

041  
- POWER OFF.

- Using the \*\*LOWEST\*\* ohms scale  
(or the 2K ohm/diode scale of  
the CE Digital Meter), measure  
the resistance between each of  
the following pins on the P7  
connector: (With the connector  
unplugged.)

RED LEAD (+) BLACK LEAD (-)

-----  
P7-1 -- P7-2  
P7-3 -- P7-2  
P7-1 -- P7-3  
P7-3 -- P7-1  
P7-5 -- P7-4  
P7-5 -- P7-6  
(Step 041 continues)

## POWER SUPPLY

MAP 6010

PAGE 7 OF 11

(Step 041 continued)

P7-6 -- P7-5

P7-6 -- P7-4

Do ALL the resistances measured  
indicate infinite resistance?

Y N

042

- Replace the Heat Sink Assembly.
- Make sure all connectors are replugged.
- Remove any jumpers that were required.
- Verify the fix.

043

- Using the \*\*LOWEST\*\* ohms scale (or the 2K ohm/diode scale of the CE Digital Meter), measure the resistance between each of the following pins on the P7 connector: (With the connector unplugged.)

RED LEAD (+) BLACK LEAD (-)  
(Step 043 continues)

(Step 043 continued)

P7-2 --- P7-1

P7-2 --- P7-3

P7-4 --- P7-5

P7-4 --- P7-6

Do ALL the resistances measured  
indicate between 15 and 25 OHMS  
(400-800 ohms on the CE Digital  
Meter)?

Y N

044

- Replace the Heat Sink Assembly.
- Make sure all connectors are replugged.
- Remove any jumpers that were required.
- Verify the fix.

V X  
6

MAP 6010-7

045

- The Regulator Board OR the Distribution Board is defective.
- Get BOTH the Regulator and the Distribution Board, but DO NOT replace the Distribution Board unless the Regulator Board fails to fix the problem.
- Make sure all connectors are replugged.
- Remove any jumpers that were required.
- Verify the fix.

046

- Replace the Distribution Board.
- Make sure all connectors are replugged.
- Remove any jumpers that were required.
- Verify the fix.

X

MAP 6010-7

POWER SUPPLY Y

A A POWER SUPPLY  
C D  
8 8 MAP 6010

PAGE 9 OF 11

058

- Replace the Distribution Board.
- Make sure all connectors are replugged.
- Remove any jumpers that were required.
- Verify the fix.

059

Is -5VDC present on P9-8 OR P9-12?

Y N

060

Is -5VDC present on P1-1?

Y N

061

- POWER OFF.

- Unplug the P9 connector.

- POWER ON.

(Step 061 continues)

(Step 061 continued)

Is -5VDC present on P1-1?

Y N

062

Is -24VDC present on P1-15?

Y N

063

- Replace the Distribution Board.

- Make sure all connectors are replugged.

- Remove any jumpers that were required.

- Verify the fix.

064

- The Regulator Board OR the Distribution Board is defective.

- Get BOTH the Regulator and the Distribution Board, but DO NOT replace the Distribution board unless the Regulator Board fails to fix  
(Step 064 continues)

A A  
F G

MAP 6010-9

(Step 064 continued)  
the problem.

- Make sure all connectors are replugged.

- Remove any jumpers that were required.

- Verify the fix.

065

GO TO MAP 6030, ENTRY POINT A.

066

- Replace the Distribution Board.

- Make sure all connectors are replugged.

- Remove any jumpers that were required.

- Verify the fix.

1  
0  
A A  
E F

A  
G

MAP 6010-9

POWER  
SUPPLY

H K A  
3 3 E  
9

POWER SUPPLY

MAP 6010

PAGE 10 OF 11

067

- Replace the Distribution Board.
- Make sure all connectors are replugged.
- Remove any jumpers that were required.
- Verify the fix.

068

- Unplug the P9 connector.
- GO TO MAP 6030, ENTRY POINT A.

069

- POWER OFF.

- Using the \*\*LOWEST\*\* OHM scale, measure the resistance between the following points and FRAME GROUND.

P9-5 P9-7 P9-9

P9-14 P1-3

(Step 069 continues)

(Step 069 continued)

Do all of the resistance readings indicate zero ohms?

Y N

070

- Replace the Distribution Board.
- Make sure all connectors are replugged.
- Remove any jumpers that were required.
- Verify the fix.

071

Was it necessary to jumper TP-1 (P2-15) to FRAME ground in a previous step?

Y N

072

Is this MAP being used to diagnose a problem of a missing voltage on the Base Planar power connector?

Y N

1 1

1 1

A A A

H J K

A  
K

MAP 6010-10

073

- All the diagnostic procedures indicate that the Power Supply is functioning properly at this time. If a problem is still indicated to be in the Power Supply, it may be necessary to use an oscilloscope to ensure that the power supply produces a constant D.C. voltage (no "ripple"). If an oscilloscope is not available, or the problem is a repeat call, it may be necessary to get ALL the modules for the power supply, and replace them in sequence. If this is necessary, the suggested order of replacement is,

1. Regulator Card AND Heat Sink Assembly.
2. Distribution Board.
3. Baseplate Assembly.

MAP 6010-10

POWER  
SUPPLY

A A POWER SUPPLY

MAP 6010-11

H J

1 1 MAP 6010

0 0

PAGE 11 OF 11

074

- POWER OFF.

- Repair the Base Planar Power Cable.

- Make sure all connectors are replugged.

- Remove any jumpers that were required.

- Verify the fix.

075

- Replace the Regulator Board.

- Make sure all connectors are replugged.

- Remove any jumpers that were required.

- Verify the fix.

POWER  
SUPPLY

MAP 6010-11



A  
1

MAP 6020

MAP 6020-2

Power Supply A.C.

PAGE 2 OF 2

(Step 004 continued)

check each of the fuses that  
were replaced in the previous  
step.

Were any of the fuses found to  
be defective?

Y N

005

- Verify the fix.

006

- Replace the Distribution  
Board.

- Verify the fix.

007

- Replace the Baseplate Assembly.

- Verify the fix.

POWER  
SUPPLY

MAP 6020-2



PAGE 1 OF 4

## ENTRY POINTS

FROM	ENTER THIS MAP		
MAP NUMBER	ENTRY POINT	PAGE NUMBER	STEP NUMBER
6010	A	1	001
6040	A	1	001

001

(ENTRY POINT A)

\*\*\*\*\*START\*\*\*\*\*

- Unplug the cable connectors from the Base Planar.
- Replace any fuses that may have been found defective.
- POWER ON.

Is K1 relay energized?

Y N

\_\_\_\_\_

2	
A	B

## EXIT POINTS

EXIT THIS MAP		TO	
PAGE NUMBER	STEP NUMBER	MAP NUMBER	ENTRY POINT
2	005	6010	A
3	018	6010	A

B

MAP 6030-1

002

- Turn POWER OFF for at least 30 seconds.
- Remove the Regulator Board.
- Unplug the Heat Sink (P7).
- Using the lowest OHM scale, check each of the fuses that were replaced in the previous step, and replace any defective fuses.
- POWER ON for at least one minute.
- Turn POWER OFF for at least 30 seconds.
- Recheck the same fuse(s).

Are any of the fuses defective?

Y N

— — — — —

2	2
C	D

MAP 6030-1

POWER  
SUPPLY

D  
1

POWER SUPPLY

MAP 6030

PAGE 2 OF 4

003

- Replug the Heat Sink (P7).
- POWER ON for at least one minute.
- Turn POWER OFF for at least 30 seconds.
- Recheck the same fuse(s).

Are any of the fuses defective?  
Y N

004

- Restore the Regulator Board to the power supply.
- POWER ON for at least one minute.
- Turn POWER OFF for at least 30 seconds.
- Recheck the same fuse(s).

Are any of the fuses defective?  
Y N

E F G

A C E F G

1 1

005

- GO TO MAP 6010, ENTRY POINT A.

006

- Replace the Regulator board.
- Verify the fix.

007

- Replace the Heat Sink Assembly.
- Verify the fix.

008

- Replace the Distribution Board.
- Verify the fix.

009

Wait 30 seconds and turn power off. Is the same D.C. fuse defective again?  
Y N

3  
H J

J

MAP 6030-2

010

- Turn POWER OFF for at least 30 seconds.
- Replug P9.
- POWER ON.

Did the problem return?  
Y N

011

- Turn POWER OFF for at least 30 seconds.
- Replug the cable connectors to the Base Planar.
- POWER ON.

Did the problem return?  
Y N

012

- Verify the fix.

3 3  
K L

MAP 6030-2

H K L  
2 2 2

POWER SUPPLY

MAP 6030

PAGE 3 OF 4

013

- The problem is a short in the Planar, the Reader/Recorder Deck, or the Printer. Go to the wiring diagram in the Service Manual to diagnose the failure.

014

- Repair the Planar Power Cable.

- Replace any defective fuses.

- Verify the fix.

015

- Turn POWER OFF for at least 30 seconds.

- Remove the Regulator Board.

- Unplug the Heat Sink (P7).

- Using the lowest OHM scale, check each of the fuses that were replaced in the previous step, and replace any defective fuses.

(Step 015 continues)

(Step 015 continued)

- POWER ON for at least one minute.

- Turn POWER OFF for at least 30 seconds.

- Recheck the same fuse(s).

Are any of the fuses defective?

Y N

016

- Replug the Heat Sink (P7).

- POWER ON for at least one minute.

- Turn POWER OFF for at least 30 seconds.

- Recheck the same fuse(s).

Are any of the fuses defective?

Y N

4

M N P

N P

MAP 6030-3

017

- Restore the Regulator Board to the power supply.

- POWER ON for at least one minute.

- Turn POWER OFF for at least 30 seconds.

- Recheck the same fuse(s).

Are any of the fuses defective?

Y N

018

GO TO MAP 6010,  
ENTRY POINT A.

019

- Replace the Regulator board.

- Verify the fix.

020

- Replace the Heat Sink Assembly.

- Verify the fix.

MAP 6030-3

POWER  
SUPPLY

M  
3

POWER SUPPLY

MAP 6030-4

MAP 6030

PAGE 4 OF 4

021

- Replace the Distribution Board.

- Verify the fix.

POWER  
SUPPLY

MAP 6030-4

## POWER SUPPLY

## D.C. TOLERANCE DIAGNOSTICS

PAGE 1 OF 4

## ENTRY POINTS

-----			
FROM	ENTER THIS MAP		
-----			
MAP	ENTRY	PAGE	STEP
NUMBER	POINT	NUMBER	NUMBER
-----			
6010	A	1	001

001

(ENTRY POINT A)

\*\*\*\*\*START\*\*\*\*\*

- Check fuses F9, F10, F11, F12, F13 and F16.

Were any fuses found to be defective?

Y N

| 002

| Is +24VDC, +12VDC, or -12VDC  
| out of tolerance?

| Y N

| | |

| | |

| | |

| | |

| | |

| | |

| | |

| | |

| | |

| | |

4 3

A B C

## EXIT POINTS

EXIT THIS MAP		TO	
PAGE NUMBER	STEP NUMBER	MAP NUMBER	ENTRY POINT
3	014	6030	A
4	019	6030	A

C

MAP 6040-1

| 003

| Is the +9VDC or +5VDC out of  
| tolerance?

| Y N

| 004

| - POWER OFF

| - Replace the Regulator Board.

| - Make sure that all components  
| and plugs that were removed  
| or unplugged, are restored.

| - Verify the fix.

| 005

| - POWER OFF

| - Remove the Regulator Board.

| - Unplug the Heat Sink Assembly  
| (P7).

| - Using the \*\*LOWEST\*\* OHM scale  
| (or the 2K ohm/diode scale of  
| the CE Digital Meter), measure  
| the resistance between each of  
| the following pins on the P7  
| connector: (With the connector  
| (Step 005 continues)

MAP 6040-1

POWER

(Step 005 continued)  
unplugged)

RED LEAD (+) BLACK LEAD (-)

-----  
P7-1 --- P7-2  
P7-3 --- P7-2  
P7-1 --- P7-3  
P7-3 --- P7-1  
P7-5 --- P7-4  
P7-5 --- P7-6  
P7-6 --- P7-5  
P7-6 --- P7-4  
-----

Do all the resistances measured  
indicate infinite resistance?

Y N

006

- Replace the Heat Sink Assembly.
- Make sure that all components and plugs that were removed or unplugged, are restored.
- Verify the fix.

D

007

- Using the \*\*LOWEST\*\* OHM scale (or the 2K ohm/diode scale of the CE Digital Meter), measure the resistance between each of the following pins on the P7 connector: (With the connector unplugged)

RED LEAD (+) BLACK LEAD (-)

-----  
P7-2 ---- P7-1  
P7-2 ---- P7-3  
P7-4 ---- P7-5  
P7-4 ---- P7-6  
-----

Do all the resistances measured  
indicate between 15 and 25 OHMS  
(400-800 ohms on the CE Digital  
meter)?

Y N

E F

E F

MAP 6040-2

008

- Replace the Heat Sink Assembly.
- Make sure that all components and plugs that were removed or unplugged, are restored.
- Verify the fix.

009

- Replug P7 and restore the Regulator Board.
- POWER ON.

Is the +5VDC Sense (P9-4) within tolerance?

Y N

010

- POWER OFF
- Unplug the P9 and P10 connectors.
- Wait at least 30 seconds.
- POWER ON.  
(Step 010 continues)

3  
G

MAP 6040-2

(Step 010 continued)

Is the +5VDC Sense (P9-4) within tolerance?

Y N

011

- POWER OFF

- Remove the Regulator Board.

- Using the \*\*LOWEST\*\* OHM scale, measure the resistance between P1-5 and FRAME ground.

Does the resistance measured indicate infinite resistance?

Y N

012

- Replace the Distribution Board.

- Make sure that all components and plugs that were removed or unplugged, are restored.

- Verify the fix.

2

013

- Replace the Regulator Board.

- Make sure that all components and plugs that were removed or unplugged, are restored.

- Verify the fix.

014

GO TO MAP 6030, ENTRY POINT A.

015

- POWER OFF

- The Regulator Board OR the Distribution Board is defective.

- Get both the Regulator Board AND the Distribution Board, But DO NOT replace the Distribution Board unless the Regulator Board fails to fix the problem.

- Make sure that all components and plugs that were removed or unplugged, are restored.

(Step 015 continues)

1

(Step 015 continued)

- Verify the fix.

016

- POWER OFF

- Remove the Power Supply from the machine.

- Wait at least 30 seconds.

- POWER ON.

- Check the A.C. output from the transformer secondary windings for the following voltages:

P4-1 to P4-2 = 11.0 to 15.0VAC

P4-2 to P4-3 = 11.0 to 15.0VAC

P4-1 to P4-3 = 22.0 to 30.0VAC

P5-1 to P5-2 = 11.0 to 15.0VAC

P5-2 to P5-3 = 11.0 to 15.0VAC

P5-1 to P5-3 = 22.0 to 30.0VAC

P6-1 to P6-2 = 8.5 to 11.5VAC

P6-2 to P6-3 = 8.5 to 11.5VAC

P6-1 to P6-3 = 17.0 to 23.0VAC

(Step 016 continues)

POWER SUPPLY

A

MAP 6040-4

TOLERANCE

1

PAGE 4 OF 4

|

|

|

|

019

(Step 016 continued)

Are any voltages missing or out  
of tolerance?

GO TO MAP 6030, ENTRY POINT A.

Y N

017

- POWER OFF

- Replace the Distribution  
Board.

- Make sure that all components  
and plugs that were removed  
or unplugged, are restored.

- Verify the fix.

018

- POWER OFF

- Replace the Baseplate Assembly.

- Make sure that all components  
and plugs that were removed or  
unplugged, are restored.

- Verify the fix.

POWER  
SUPPLY

MAP 6040-4







International Business Machines Corporation  
Office Products Division  
Customer Engineering

Form No. 241-6047-0

Printed In USA February, 1978